Smart meter monitoring: Using HP ArcSight in the utility industry

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Introduction
“The era of pilots is a distant memory; the current focus is now on integrating and optimizing information gathered by smart meters...”

Utility-Scale Smart Meter Deployments
Innovation Electricity Efficiency Institute
of the Edison Foundation
August 2013
Electric utilities
Electric utility industry overview

Introduction

• Change and modernization

• Grid complexity

• Demand must equal supply (usually...)
Terminology

Electric power delivery components

**Energy grid** – an interconnected network used to deliver power from producers to consumers. At a high-level, the electric grid consists of three elements.

**Generation** – Where the power is generated. Traditionally, this was the large coal, nuclear, or natural gas generation facility. The network that became the modern grid was designed to move power from these facilities to the consumers. Generation is now becoming much more complex as alternative technologies are pushing power onto the grid at many locations (wind farms, solar panels on home roofs)
Terminology

**Electric power delivery components**

**Generation**
Terminology

Electric power delivery components

Transmission

Transmission – Long-haul, high voltage portion of the grid. It is defined by large towers that move power over long distances. Voltage is increased in order to minimize the power loss that can occur over large distances.
Terminology

Electric power delivery components

Distribution

Distribution – Lower voltage local portion of the grid. It includes the overhead and underground components that deliver power to homes and businesses. Much of the current grid automation has occurred in this portion of the power grid which also includes the smart meters used to measure and control power delivery to the consumer.
Terminology

**Smart meter infrastructure: Automatic meter reading**

AMR – Automatic Meter Reading – Electric meters that transmit data one-way for billing purposes, usually from the customer to the distribution utility.
Terminology

Smart meter infrastructure : Advanced metering infrastructure

AMI – Advanced Metering Infrastructure – Electric meters that measure and record usage data at a minimum, in hourly intervals, and provide usage data to both consumers and energy companies at least daily.

Advanced Metering Infrastructure Systems (AMI)
Terminology

Smart meter infrastructure: Head-End System

Head-End System – System that receives meter data. This system is the gateway to other utility systems, making data available internally for analysis. It can also be leveraged for on-demand reads, remote shutoffs, and other activities in an AMI environment.
Industry focus

7 key areas of energy grid focus

Grid edge optimization

Grid edge optimization – increasing visibility at the edges of the traditional electricity distribution network to improve service reliability and increase grid efficiency.
Industry focus

7 key areas of energy grid focus
Grid resiliency, reliability, and restoration

Grid resiliency, reliability, and restoration – making the grid less vulnerable to weather related outages and reducing the time it takes to restore power after an outage does occur.
Industry focus

7 key areas of energy grid focus
Grid visibility and asset management

Grid Visibility and Asset Management – Deploying distribution network automation and advanced metering infrastructure, and linking systems to improve asset management and the operational efficiency of electric distribution systems.
Industry focus

7 key areas of energy grid focus

Grid analytics
Using information from smart meters, grid sensing devices, and asset monitoring for end-to-end data analytics to optimize the transmission and distribution systems and improve grid performance.
Industry focus

7 key areas of energy grid focus
Renewable energy, distributed generation, and storage integration

Renewable energy, distributed generation, and storage integration – integrating distributed generation resources into the power grid, deploying micro-grids, and utilizing electrical energy storage devices effectively in a robust, flexible, and reliable grid.
Industry focus

7 key areas of energy grid focus:
Customer engagement

Customer engagement – educating and empowering electric utility customers to manage their energy use more strategically and efficiently
Industry focus

7 key areas of energy grid focus: Demand response and energy management

Demand response and energy management – Using technology to simplify and automate customer involvement in peak demand response events, and using demand response to manage renewable energy integration
Industry focus – smart meter

Unifying element

Smart meters are a key component to each of the seven areas of energy grid focus
History

Smart meter deployments in the United States: July 2013

Source: Utility-Scale Smart Meter Deployments - Innovation Electricity Efficiency Institute of the Edison Foundation - 2013
Current deployment plans

Smart meter infrastructure

- Currently solid, defined project plans for the deployment of an additional 24M Smart Meters in the US over the next decade
- Very large projects getting underway in several locations
  - AEP (multiple states) – 4,000,000+ smart meters
  - Ameren (IL) – 780,000 smart meters
  - Baltimore Gas and Electric (MD) – 1,000,000 smart meters
  - Commonwealth Edison (IL) – 3,700,000+ smart meters
  - DTE Energy (MI) – 1,600,000 smart meters
  - and many, many more

- Keep in mind, these are the numbers of additional meters that are currently planned. These numbers continue to grow over time
Implementation map

US smart meter implementation map through 2015

Source: Utility-Scale Smart Meter Deployments - Innovation Electricity Efficiency Institute of the Edison Foundation - 2013
HP smart meter story

Industry leader

• Of the 46 M Smart Meters currently deployed in the United States, three utilities are responsible for nearly a third of installed meters.
• HP Enterprise Security is a key partner of two of these top 3 utilities and is in discussions with the third
• HP ArcSight is currently used to run a Smart Meter Security Operations Center (SOC) for one of these organizations which includes the following:
  – Power outage event correlation
  – Meter failures and tampering
  – Integration with internal systems to reduce technician dispatch
HP smart meter story

Future use cases

• Correlation of voltage events to identify fraud

• Correlation of physical security events (meter tilt tamper events) with micro-earthquake data to reduce technician dispatch

• Correlation of load situations with installation/re-connect activity to identify potential phase mis-matches and fire risk

• Many others...
For more information

Attend these sessions
• TT3041, Non-Standard use cases for SIEM technology
• TB3057, Defining, building, and making use cases work

Visit these demos
• Find threats with HP ArcSight ESM, DEMO 3525
• HP Enterprise Security support experts, DEMO3563

After the event
• Contact your sales rep
• Visit the website at: http://www.hp.com/go/sirm

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